

Advanced Algebra I Chapter 2 Part I

Date	Class	TOPIC	PRACTICE
	1	Topic 1: Writing Equations	In-Class computer practice
	2	Topic 2: Solving One-Step Equations	worksheet p41 "What can you say about..."
	3	Topic 3: Solving Multi-Step Equations	In Class board work
	4	Topic 4: Solving Equations with Variables On Both Sides	Practice solving equations worksheet
	5	Extra Practice Solving Equations	Eclicker practice and/or half sheet practice
	6	Quiz - Solving Equations	
	7	Topic 5: Solving Absolute Value Equations	Topic 5 Practice worksheet
	8	Topic 6: Literal Equations	Practice on white boards
	9	Extra Practice - Topics 5 and 6	Topics 5 and 6 Practice worksheet
	10	Review	Ch 2 Part I review sheet
	11	Chapter 2 Test Part 1	

Note: ~~2~~ Classes equals 1 Block Day

Writing Equations

Translate each sentence into an equation or formula.

1. Fifty-three plus four times b is as much as 21.
2. The sum of five times h and twice g is equal to 23.
3. One fourth the sum of r and ten is identical to r minus 4.
4. Three plus the sum of the squares of w and x is 32.
5. Degrees Kelvin K equals 273 plus degrees Celsius C .
6. The total cost C of gas is the price p per gallon times the number of gallons g .
7. The sum S of the measures of the angles of a polygon is equal to 180 times the difference of the number of sides n and 2.

You Try...

Translate each sentence into an equation or formula.

Three times a number t minus twelve equals forty.

One-half of the difference of a and b is 54.

The area A of a circle is the product of π and the radius r squared.

Solving Single-Step Equations (Use the opposite operation)

Solve each equation. Then check your solution.

$$d - 8 = 17$$

$$v + 12 = -5$$

$$8j = 96$$

$$\frac{y}{9} = -8$$

Examples:

$$-84 = \frac{d}{3}$$

$$8 - (-c) = 1$$

$$\frac{5}{9} + q = \frac{2}{3}$$

$$\frac{1}{5}p = \frac{3}{5}$$

$$-3x = \frac{3}{2}$$

$$\frac{2}{3}a = 6$$

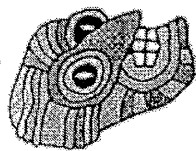
You try...

① $-13z = -39$

② $29 = a - 76$

③ $\frac{7}{10}m = 14$

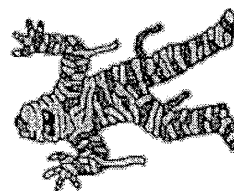
④ $78 + r = -15$



What Can You Say About a Really Terrible Mummy Joke?

Solve, then cross out the letter above the solution. When you are finished, the answer to the title question will remain.

- | | | | |
|--------------------------|---------------------------------------|-------------------------|--------------------|
| 1. $y - 13 = -5$ | 2. $\frac{m}{-15} = -4$ | 3. $a + 70 = 2$ | 4. $-3t = 99$ |
| 5. $\frac{1}{6}k = -11$ | 6. $-14 + u = 50$ | 7. $-18x = -360$ | 8. $-75 = n + 9$ |
| 9. $30 = 12d$ | 10. $4\frac{1}{2} + q = 9\frac{1}{2}$ | 11. $24 = -\frac{v}{3}$ | 12. $-20 = -7 + w$ |
| 13. $64 = x + 100$ | 14. $-\frac{1}{9}b = -12$ | 15. $q + (-1) = 16$ | 16. $45p = -180$ |
| 17. $-6 = \frac{1}{20}h$ | 18. $m - (-4) = 32$ | 19. $-10a = -72$ | 20. $-12 = y - 36$ |
| 21. $-8e = 4$ | 22. $\frac{x}{25} = -25$ | 23. $-92 + w = -10$ | 24. $-n = 40$ |



F I U N E W R A T I S T L O P E O R H E A K I T O S N U E X T P

2.5	-15	20	-72	8	-66	-68	5	-75	64	7	-13	60	-84	32	-33	82	28	-500	17	24	-120	16	-625	-36	7.2	-32	108	-40	144	-0.5	-4
Answers 1-12																	Answers 13-24														

Solving Multi-Step Equations.

- isolate variable term first (you may need to distribute or combine like terms first)
- use opposite operation to get variable by itself

Examples

$$5x + 3 = 23$$

$$5 + \frac{x}{4} = 1$$

$$18 - 4v = 42$$

$$\frac{3}{4}q - 7 = 8$$

$$-\frac{h}{3} - 4 = 13$$

$$\frac{3k - 7}{5} = 16$$

$$2n + 3n + 7 = -41$$

$$-6 - 3(2k + 4) = 18$$

Word Problems

Find two consecutive integers whose sum is 19.

Find three consecutive even integers whose sum is 132.

COIN COLLECTING Jung has a total of 92 coins in his coin collection. This is 8 more than three times the number of quarters in the collection. How many quarters does Jung have in his collection?

You try...

❶ $8 - 5w = -37$

❷ $2(3h + 2) - 4h = -16$

❸ $-\frac{d}{6} + 12 = -7$

❹ $\frac{b + 1}{3} = 2$

Solving Equations with Variables on Each Side

- get variables on one side by using opposite operations (distribute first if you need to.)
- get all numbers on the other side by using opposite operations
- solve for the variable

$$2x + 1 = x + 11$$

$$5a - 3 = 8a + 6$$

$$2(6m - 1) = 8m$$

$$2(s + 11) = 5(s + 2)$$

$$7y - 1 = 2(y + 3) - 2$$

$$-7 - 4c = 3c - 7$$

Some equations have no solution. The solution set is the null or empty set, which is represented by \emptyset .

$$2(x - 1) = 4 + 2x$$

Other equations have every number as a solution. The solution set would be all real numbers. Such an equation is called an identity. The solution is ALL REAL NUMBERS.

$$-2(x - 1) = 2 - 2x$$

Word Problems

NUMBER THEORY Tripling the greater of two consecutive even integers gives the same result as subtracting 10 from the lesser even integer. What are the integers?

GEOMETRY The formula for the perimeter of a rectangle is $P = 2\ell + 2w$, where ℓ is the length and w is the width. A rectangle has a perimeter of 24 inches. Find its dimensions if its length is 3 inches greater than its width.

You Try...

❶ $4 - 3b = 6b - 5$

❷ $2(3d + 7) = 5 + 6d$

❸ $1 + 2(b + 6) = 5(b - 1)$

❹ **NUMBERS** Two thirds of a number reduced by 11 is equal to 4 more than the number. Find the number.

Algebra I Topic 4
Solving Equation Practice

Name: _____

****You must show your steps in solving.****

Solve each equation. Check your solution.

1. $-3(x + 5) = 3(x - 1)$

2. $2(7 + 3t) = -t$

3. $3(a + 1) - 5 = 3a - 2$

4. $75 - 9g = 5(-4 + 2g)$

5. $5(f + 2) = 2(3 - f)$

6. $4(p + 3) = 36$

7. $18 = 3(2t + 2)$

8. $3(d - 8) = 3d$

9. $5(p + 3) + 9 = 3(p - 2) + 6$

10. $4(b - 2) = 2(5 - b)$

11. $3(3x - 2) = 9(x - 8)$

12. $\frac{3x+1}{4} = \frac{-x}{8}$

13. $\frac{a-8}{12} = \frac{2a+5}{3}$

14. $2(4 + 2k) + 10 = k$

15. $2(w - 1) + 4 = 4(w + 1)$

Solutions: 1) $x = -2$ 2) $t = -2$ 3) $a = \text{all real numbers}$ 4) $g = 5$ 5) $f = -\frac{4}{7}$ 6) $p = 6$ 7) $t = 2$ 8) \emptyset

9) $p = -12$ 10) $b = 3$ 11) \emptyset 12) $x = -\frac{2}{7}$ 13) $a = -4$ 14) $k = -6$ 15) $w = -1$

ABSOLUTE VALUE

What does absolute value mean?

Evaluating absolute value expressions:

Evaluate $|t - 5| - 7$ if $t = 3$.

Evaluate each expression if $r = -2$, $n = -3$, and $t = 3$.

$$|n - t| + 4$$

$$-|r + n + t|$$

ABSOLUTE VALUE EQUATIONS

****What is an absolute value?****

$$|4| = \qquad \qquad |-4| =$$

Solve: $|x| = 4$

Solving Absolute Value Equations

An absolute value equation has **TWO** solutions.

When solving absolute value equations, take the following steps:

- ① get the absolute value by itself (*Be careful~can an abs value be negative?)
- ② split into two equations - the 1st exactly as is, the 2nd with the opposite of the side not in the absolute value
- ③ solve each equation

Example:

$$|2x + 3| = 7$$

absolute value is already by itself

split into two equations

now solve each equation

More Examples:

$$|2x - 4| = 2$$

$$|x| + 3 = 6$$

$$8 = |5x| - 2$$

$$-2|5 + x| = 14$$

You try... Solve each equation.

① $|2x + 3| = 5$

② $4|r - 4| = 12$

③ $17 = 12 + |n + 1|$

④ Evaluate $2 - |3n + 4|$ if $n = -2$

Practice:

Evaluate each expression if $x = -1$, $y = 3$, and $z = -4$.

1. $16 - |2z + 1|$

2. $|x - y| + 4$

3. $|-3y + z| - x$

4. $3|z - x| + |2 - y|$

Solve each equation.

$|x - 13| = 2$

$|2z - 9| = 1$

$|2g - 5| = 9$

$10 = |1 - c|$

$|p - 7| = -14$

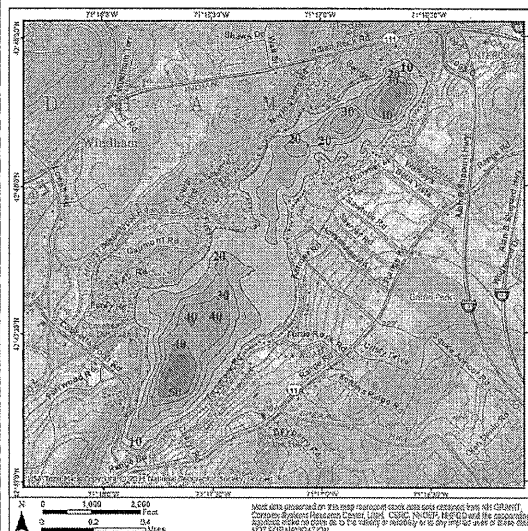
$|7x - 3x| + 2 = 18$

$3|4x - 9| = 24$

$|2y - 7| + 5 = 9$

Literal Equations

Your best friend lives on the opposite end of Cobbett's Pond from you (2 miles apart). Your friend is having a cookout and you want to work up an appetite on your way, so you will *swim* there. If you know you swim at a rate of 50ft per minute, what time do you need to leave in order to make it to her cookout by 12 noon?



If an equation that contains more than one variable is to be solved for a specific variable, use the same techniques that you use to solve equations, to isolate the specified variable on one side.

(The following example will be really useful when we get to graphing equations of lines!)

Example 1 Solve $2x - 4y = 8$, for y .

Example 3: Solve $xy + w = 9$, for y

Example 4: Solve $x(4 - k) = p$, for k

The perimeter of a square field is given by the equation $P = 2l + 2w$, where P represents the perimeter, l represents the length of the field, and w represents the width of the field.

a. Solve the formula for l .

b. Find the length of a field that is 50 yards wide and has a perimeter of 220 yards.

You try...

Solve each equation or formula for the variable indicated.

1. $ax - b = c$, for x

2. $7x + 3y = 6$, for y

- 3 **WATER PRESSURE** The water pressure on a submerged object is given by $P = 64d$, where P is the pressure in pounds per square foot, and d is the depth of the object in feet.

a. Solve the formula for d .

b. Find the depth of a submerged object if the pressure is 672 pounds per square foot.

Advanced Algebra I

Absolute Value and Linear Equations Practice

Evaluate each expression if $a = 2$, $b = -3$, and $c = -4$.

1. $|a - 5| - 1$

2. $|b + 1| + 8$

3. $5 - |c + 1|$

4. $|a + b| - c$

Solve each absolute value equation. ****Remember: there are 2 solutions to absolute value equations****

5. $|w + 1| = 5$

6. $|4x - 1| = 15$

7. $|x - 4| + 7 = 15$

8. $-2|3x + 1| = -10$

Solve each equation or formula for the variable indicated.

9. $d = rt$, for r

10. $4x + 3y = -4$, for y

11. $2x - 3y = 6$, for y

12. $\frac{2}{3}m + a = a + r$, for m

13. $\frac{rx + 9}{5} = h$, for x

14. $\frac{1}{2}x - \frac{1}{4}y = 6$, for y

Solutions: 1) 2 2) 10 3) 2 4) 5 5) $w = 4, -6$ 6) $x = 4, -\frac{7}{2}$ 7) $x = 12, -4$ 8) $x = -2, \frac{4}{3}$ 9) $r = \frac{d}{t}$
 10) $y = \frac{-4 - 4x}{3}$ 11) $y = -2 + \frac{2}{3}x$ 12) $m = \frac{3}{2}r$ 13) $x = \frac{5h - 9}{r}$ 14) $y = -24 + 2x$

Algebra I

Chapter 2 Review – Part I

Solve the equation.

1. $7a = 27 + 2a$

2. $\frac{3}{4}x = 9$

3. $\frac{r-8}{6} = -7$

4. $|3x+1| = 13$

5. $3(n+5) - 6 = 3n + 9$

6. $\frac{1}{3}(y+2) = 10$

7. $|x-5| + 6 = 18$

8. $\frac{x}{3.1} = 4.5$

9. $|3x-2| - 5 = 20$

10. $7 + 2.85y = 2 + 12.85y$

11. $7x + 9 = 3(x + 3)$

12. $2(y + 3) = -2(1 - y)$

13. $-3t + 2(2t + 1) = 9 + 2t$

14. $-2p + 4(3p - 1) = 40 - p$

15. $-2(2 - 5m) = 5(2m - 2) + 6$

16. $6(y - 2) + 3 = 21 + 2(y - 1)$

Write the equation so that y is a function of x .

17. $5x - 3y = 9$

18. $4(2x - y) = 6$

19. $4x = -2y + 26$

Solve each literal equation for x .

20. $c = \frac{x+a}{b}$

21. $\frac{x}{a} + b = c$

22. The penny size of a nail called d , is given by $d = 4n - 2$ where n is length (in inches) of a nail.

a. Solve the formula for n .

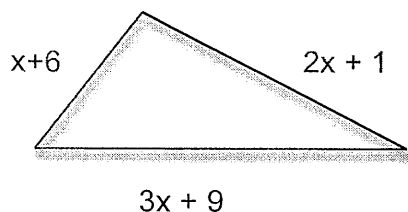
b. Use the new formula to find the length of a nail with the a penny size of 5.

23. To participate in a bowling league, you must pay a \$25 sign-up fee and \$12 for each league night that you bowl.

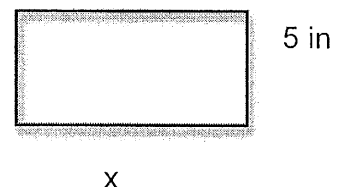
a. Write an equation to model this situation. Declare your variables.

b. Use your equation to determine how many nights you can bowl if you have \$133 to spend.

24. The perimeter of the triangle below is 40 cm. Write and solve an equation to find the value of x .



25. The area of the rectangle is 60in^2 . Write and solve an equation to find the value of x .



26. **Write and solve** an equation to find three consecutive integers whose sum is 75.

27. **Write and solve** an equation to find three consecutive odd integers whose sum is 117.